I claim

1. An isolated and purified DNA sequence substantially similar to the DNA sequence shown in SEQ ID 1.

2. An isolated and purified DNA sequence that hybridizes to the DNA sequence shown in SEQ ID 1 under high stringency hybridization conditions.

3. An isolated and purified DNA sequence that consists essentially of the DNA sequence shown in SEQ ID 1.

4. A recombinant DNA molecule comprising the isolated and purified DNA sequence of Claim 1, 2, or 3 subcloned into an extra-chromosomal vector.

5. A recombinant host cell comprising a host cell transfected with the recombinant DNA molecule of Claim 4.

6. A recombinant host cell deposited with the ATCC under accession number 98402.

7. An isolated and purified DNA sequence substantially similar to the DNA sequence shown in SEQ ID 3.

8. An isolated and purified DNA sequence that hybridizes to the DNA sequence shown in SEQ ID 3 under high stringency hybridization conditions.

9. An isolated and purified DNA sequence that consists essentially of the DNA sequence shown in SEQ ID 3.

10. A recombinant DNA molecule comprising the isolated and purified DNA sequence of Claim 7, 8, or 9 subcloned into an extra-chromosomal vector.

11. A recombinant host cell comprising a host cell transfected with the recombinant DNA molecule of Claim 10.

12. A recombinant host cell deposited with the ATCC under accession number 98403.

13. A recombinant host cell deposited with the ATCC under accession number 98404.

14. A recombinant host cell deposited with the ATCC under accession number 98405.

15. An isolated and purified DNA sequence selected from the group consisting of SEQ ID 11, SEQ ID 13, SEQ ID 21, SEQ ID 23, SEQ ID 25, SEQ ID 27, SEQ ID 29, SEQ ID 31, SEQ ID 33, SEQ ID 35, SEQ ID 37, SEQ ID 39, SEQ ID 41, SEQ ID 43, SEQ ID 45, SEQ ID 47, and SEQ ID 49.

16. A recombinant DNA molecule comprising an isolated and purified DNA sequence of Claim 15, subcloned into an extra-chromosomal vector.

17. A recombinant host cell comprising a host cell transfected with a recombinant DNA molecule of Claim 16.

18. A substantially purified recombinant polypeptide, wherein the amino acid sequence of

the substantially purified recombinant polypeptide is substantially similar to the amino acid sequence shown in SEQ ID 2.

19. A substantially purified recombinant polypeptide, wherein the amino acid sequence of the substantially purified recombinant polypeptide consists essentially of the amino acid sequence shown in SEQ ID 2.

20. A substantially purified recombinant polypeptide, wherein the amino acid sequence of the substantially purified recombinant polypeptide is substantially similar to the amino acid sequence shown in SEQ ID 4.

21. A substantially purified recombinant polypeptide, wherein the amino acid sequence of the substantially purified recombinant polypeptide consists essentially of the amino acid sequence shown in SEQ ID 4.

22. A substantially purified recombinant polypeptide, wherein the amino acid sequence of the polypeptide is selected from the group consisting of SEQ ID 12, SEQ ID 14, SEQ ID 22, SEQ ID 24, SEQ ID 26, SEQ ID 28, SEQ ID 30, SEQ ID 32, SEQ ID 34, SEQ ID 36, SEQ ID 38, SEQ ID 40, SEQ ID 42, SEQ ID 44, SEQ ID 46, SEQ ID 48, and SEQ ID 50.

23. An antibody that selectively binds polypeptides with an amino acid sequence substantially similar to the amino acid sequence of Claim 18, 19, 20, 21 or 22.

24. A method of detecting SAG protein in cells, comprising contacting cells with the antibody of Claim 23 and incubating the cells in a manner that allows for detection of the SAG protein-antibody complex.

25. A diagnostic assay for detecting cells containing SAG mutations, comprising isolating total genomic DNA from the cell and subjecting the genomic DNA to PCR amplification using primers derived from the isolated and purified DNA sequence of Claim 1, 2, 3, 7, 8, 9, or 15, and determining whether the resulting PCR product contains a mutation.

26. A diagnostic assay for detecting cells containing SAG mutations, comprising isolating total cell RNA, subjecting the RNA to reverse transcription-PCR amplification using primers derived from the isolated and purified DNA sequence of Claim 1, 2, 3, 7, 8, 9, or 15 and determining whether the resulting PCR product contains a mutation.

27. A method of isolating RNA containing stretches of polyA or polyC residues, comprising

(a) contacting an RNA sample with SAG protein in RNA binding buffer in the presence of a reducing agent;

(b) incubating the RNA-SAG protein mixture with the antibody of Claim 23;

(c) isolating the antibody-SAG protein-RNA complexes; and

(d) purifying the RNA away from the antibody-SAG protein complex.

28. A method of isolating RNA containing stretches of polyU residues, comprising

(a) contacting an RNA sample with SAG protein in RNA binding buffer in the absence of reducing agents;

(b) incubating the RNA-SAG protein mixture with the antibody of Claim 23;

(c) isolating the antibody-SAG protein-RNA complexes; and

(d) purifying the RNA away from the antibody-SAG protein complex.

29. A method for isolating genes induced during cell apoptosis, comprising:

(a) treating one set of cells with OP and not treating a control set of cells;

(b) isolating RNA from each set of cells;

(c) subjecting the RNA from each set of cells to the differential display procedure, wherein the RNA is reverse transcribed into cDNA and the cDNA is subjected to the polymerase chain reaction;

(d) identifying cDNAs that are expressed in the OP-treated set of cells and not in the control set of cells; and

(e) cloning the OP-induced cDNAs.

30. A method for protecting cells from apoptosis induced by redox reagents, comprising introducing into the cells an expression vector comprising the isolated and purified DNA sequence of Claim 1, 2, 3, 7, 8, 9, or 15, which is operatively linked to a DNA sequence that promotes the high level expression of the isolated and purified DNA sequence in the cells.

31. A method for inhibiting the growth of tumor cells, comprising introducing into the tumor cells an expression vector comprising the isolated and purified DNA sequence of Claim 1, 2, 3, 7, 8, 9, or 15, which is operatively linked to a DNA sequence that promotes the high level expression of the antisense strand of the isolated and purified DNA sequence in the cells.

32. A method for purifying SAG protein from bacterial cells comprising:

a) transfecting a bacterial host cell with a vector comprising the isolated and purified DNA sequence of Claim 1, 2, 3, 7, 8, 9, or 15 operatively linked to a promoter capable of directing gene expression in a bacterial host cell;

b) inducing expression of the isolated and purified DNA sequence in the bacterial cells;

c) lysing the bacterial cells;

d) isolating bacterial inclusion bodies;

e) purifying SAG protein from the isolated inclusion bodies.

33. A pharmaceutical composition comprising the substantially purified recombinant polypeptide of Claim 18, 19, 20, 21, or 22 and a pharmaceutically acceptable carrier.

34. The pharmaceutical composition of Claim 33 wherein the substantially purified recombinant polypeptide comprises an oligomer.

35. A method of oxygen radical scavenging in an organism comprising administering an oxygen radical -reducing amount of the pharmaceutical composition of Claim 33 or 34 to the organism.

36. A method of promoting the healing of a wound comprising administering the DNA sequence of Claim 1 to cells associated with the wound.

37. A method of promoting or inhibiting the growth of plant cells comprising administering the DNA sequence of Claim 1 or a DNA sequence which is complementary to the DNA sequence of Claim 1 to plant cells.

Add C9

Add D3